

Injury Prevention Research at the Centers for Disease Control and Prevention

Recognizing the critical public health burden that unintentional and violent injuries place on the United States, Congress mandated in 1992 that the Centers for Disease Control and Prevention (CDC) create the National Center for Injury Prevention and Control (NCIPC). NCIPC was established to coordinate research and programmatic responses to the problem of nonoccupational injuries.

MORBIDITY, MORTALITY, AND THE COST OF INJURIES

Violent and unintentional injuries place a severe physical, emotional, and financial burden on our communities. Injuries do not discriminate; they affect all races and ages. In fact, injuries are the leading cause of death in the first 4 decades of life.¹ In 2001, the leading causes of deaths due to injury in the United States were motor vehicle crashes, suicides, and falls.

In addition to being a major cause of death, injuries cause suffering and disability. Virtually everyone knows of someone whose life has been changed because of a motor vehicle crash or other injury-causing event. Each year, Americans make 30 to 40 million visits to emergency departments for treatment of injuries.² Except for teenagers and young adults, falls are the leading cause of emergency department visits; for persons aged 15 to 23 years, motor vehicle crashes and striking or being struck by objects predominate.¹

The economic costs of injuries impose a significant burden on society as well. In 2000, the United States spent \$117 billion treating injuries, accounting for 10% of all medical expenditures that year.³ The percentage of total medical expenditures accounted for by injuries in 2000 was comparable to the percentages attributable to other leading public health issues, such as obesity (9.1%) and smoking (6.5%–14.4%).

The mission of NCIPC is to prevent or reduce injuries. To accomplish its goals, NCIPC works with numerous partners to support injury surveillance, research, and prevention programs and to disseminate information that can inform prevention programs and policies. There is strong evidence of the effectiveness of many preventive interventions, including use of seat belts⁴ and bicycle helmets,⁵ laws establishing 0.08 blood alcohol content as the definition for drunk driving,⁶ and residential smoke alarm and fire safety education programs.⁷ Effective violence prevention strategies include home visitation of new parents to prevent mistreatment of children⁸ and tenant-based rental assistance programs to prevent youths from witnessing or becoming victims of crime.⁹

Widespread implementation of such interventions could save thousands of lives annually. However, despite the progress that has been made, there is still much to be learned about preventing unintentional and violent injuries and about encouraging the dissemination and adoption

of strategies that have proven effective.

NCIPC RESEARCH: GOALS AND STRATEGIES

Through a participatory process, NCIPC and its partners developed an Injury Research Agenda, which was published in June 2002.¹⁰ The agenda categorizes research needs along a continuum, beginning with risk factor identification, proceeding through intervention evaluation, and ending with dissemination research.

While the agenda recognizes the need for additional descriptive research, it emphasizes the right side of the continuum—intervention and dissemination research.

The Injury Research Agenda includes 7 broad categories: injuries occurring at home and in the community; injuries occurring during sports, recreation, or exercise; transportation injuries; intimate partner violence, sexual violence, and child maltreatment; suicide; youth violence; and acute care, disability, and rehabilitation. The first 6 emphasize prevention, while the seventh focuses on improving outcomes when prevention efforts fail (e.g., enhancing systems for emergency treatment).

The agenda includes cross-cutting themes such as alcohol use, parenting and supervision styles, economic costs, and dissemination of scientific findings. It also identifies the importance of building injury-related research infrastructure, which, for example, will provide ongoing support for young researchers. The NCIPC New Investigator

and Dissertation grant awards, as well as funds for training and pilot studies, have been established to help fill this need.

Of the research issues raised in the agenda-setting process, 48 topics were deemed highest priority, each of which will require 10 to 20 studies to address adequately. NCIPC is using its available funds to address these priority topics; researchers wishing to apply for NCIPC funds can use the research agenda to anticipate future funding announcements. In fiscal year 2003, the NCIPC research budget of \$41 million funded researcher-initiated grants (37.5% of funds), research centers (29.4%), research cooperative agreements (25.5%), and research contracts (7.6%). At this level of funding, full implementation of the Injury Research Agenda may take some time. However, at CDC it is firmly believed that lives will be saved and suffering will be reduced with this funding.

INJURY RESEARCH: OPPORTUNITIES AND CHALLENGES

The context in which research is conducted is changing rapidly. Injury researchers should be aware of changing opportunities and expectations related to accountability for the expenditure of federal funds, openness during the conduct and dissemination of research findings, emphasis on research addressing linked health problems, and globalization.

Federal agencies are increasingly being held accountable not just for the appropriateness of their expenditures, but also for describing the impact of their research. Typical measures of research success (such as published findings in peer-reviewed jour-

nals), while easy to count, do not answer the fundamental question "What difference has your research made?" Answers like "It is too soon to tell" no longer satisfy policymakers faced with difficult funding decisions.

While continuing to produce publications and other products, scientists should also collect personal stories from people whose lives have been affected by the research, as well as information on specific uses of the findings. Initial research protocols should include strategies for disseminating the findings and ensuring that the next steps in the public health continuum are taken. Next steps might include conducting follow-up research, sustaining a successful demonstration program, or disseminating study results to policymakers and tracking whether the results effect policy or legislative change.

The speed and scope of the global communication infrastructure present an enormous opportunity to injury researchers. Members of research consortia have for some time used the Internet to share information. Recently, the public health community received a glimpse of its potential future when researchers around the world shared data to quickly identify the causal organism of severe acute respiratory syndrome (SARS).¹¹ This unprecedented collaboration provides a model for how researchers can solve complex public health problems by working together. The application of this model in nonacute settings needs to be explored.

The enhanced communication infrastructure provides opportunities to respond to the public's increasing demand for health information. Injury researchers now have the opportunity to dis-

seminate their findings not just through academic journals, but also through Web sites, newspapers, and other venues with large audiences. Often, researchers are reluctant to reduce their findings to sound bites that fail to capture the nuances of their work. Nevertheless, by quickly disseminating their findings, researchers can take advantage of the public's interest in health and safety and can provide usable information for both the public and policymakers.

The Internet has generated interest in the sharing of government-sponsored research data. New policy requires researchers receiving federal funds above a specific amount to make their data available to others, while at the same time ensuring the confidentiality of research participants.¹² The goal of this policy is to ensure that data are used as widely as possible to inform research and program efforts. The policy may also inspire new collaborations between researchers and practitioners with shared interests.

Openness and participation also apply to the way research is conducted. This is reflected by the increasing emphasis placed on research that incorporates community partners at all stages.¹³ Community participatory research not only increases the relevancy (external validity) of the work, it also enhances the adoption of scientific findings in practice settings. However, such research can be very challenging. Researchers and community partners with different research emphases may need to negotiate. Research outcomes may take longer, and questions may arise about the quality or rigor (internal validity) of the research. Lessons learned from successful,

rigorous community research should be disseminated to the injury research community and be used to train students in community research methods and partnership building.

Another prevalent theme in injury research is the need to account for linkages between various health problems as they occur among individuals and in communities. This consideration often arises in the context of doing community participatory research. CDC, including NCIPC, has tended to fund research in a categorical manner, with funds provided to address specific outcomes (e.g., motor vehicle injuries) or risk factors (e.g., tobacco use). However, behaviors and other risk factors are often common to many types of injuries and public health problems. For example, risky alcohol use is a well-known factor in many types of injuries, and recent research shows impulsivity to be a potentially important risk factor for suicide,¹⁴ unintentional injuries, deaths from motor vehicle crashes, and drownings. Understanding how to measure and improve the supervision of young children is also critical in addressing child neglect, injuries due to falls, and drownings.

NCIPC funds for community participatory research and addressing crosscutting issues have been limited. CDC, however, has received funding for extramural, peer-reviewed prevention research and has directed the funds toward these purposes,¹⁵ thus placing a high priority on increasing its investment in such research.

While much of CDC's research, including that of NCIPC, has focused on interventions directed at individuals, etiological

studies have shown the importance of community-level factors. For example, community-level variables associated with violence include poverty, residential instability, and low neighborhood collective efficacy. These factors have an impact beyond what might be expected from the characteristics of the individuals living within the community.¹⁶ Using these data, NCIPC hopes to stimulate research on the effectiveness of modifying community-level factors to reduce violent outcomes.

A final theme in injury prevention is the need to be an active participant in a global community that is committed to injury prevention and control. While most CDC investments in global health target infectious diseases, CDC and others recognize the growing importance of preventing and controlling noncommunicable diseases and conditions. Worldwide, injuries—whether they result from road traffic, suicide, falls, interpersonal violence, or war—take an enormous toll on lives. Motor vehicle crashes alone are anticipated to become the third leading cause of disability-adjusted life years (DALYs) by 2010, up from ninth place in 1990.¹⁷ As we increase our ability to control infectious and nutritional causes of child death and illness, we observe that injuries make up a greater proportion of DALYs among young children. For example, in Southeast Asia, unintentional injuries are now the fifth leading cause of DALYs among children younger than 5 years.¹⁸

Emphasizing global efforts to reduce road traffic deaths and injuries is particularly crucial at this time. The injury burden of road traffic crashes is steadily increasing worldwide; globally, for

men aged 15 to 44 years, road traffic injuries rank second only to HIV/AIDS as the leading cause of illness and premature death.¹⁸ In recognition of this burden, the World Health Organization has dedicated World Health Day 2004 to road traffic safety.¹⁹ On April 7, 2004, and in the weeks that follow, events around the world will draw attention to road traffic crashes and potential solutions. The United Nations will also stress the need for public health and transportation agencies to work together to address this problem.

CONCLUSION

Worldwide, injuries remain a leading cause of death and suffering. While effective interventions exist for some injury-related problems, more research is needed to better understand how successful interventions can be incorporated into practice settings. For other injury issues, much more research is needed. The CDC Injury Research Agenda lays out NCIPC research priorities for the next several years. As researchers develop and implement the ideas presented in the agenda, they should take into account the changing research scene and their role in reducing the public health burden worldwide, and they should avail themselves of opportunities to make an even greater impact. ■

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This editorial was accepted January 7, 2004.

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